e-reporting in the EU and links to INSPIRE

Workshop: Metadata for Air Quality and Atmospheric Composition,

GEO group for Earth Observations, Air Quality Community of Practice

Sheila Cryan,
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EU air quality policy

- To achieve levels of air quality that do not result in unacceptable impacts on , and risks to, human health and the environment
  Objective Sixth Community Environment Action Programme (*6EAP)*

EU air quality legislation AQD

- [Directive 2008/50/EC](#) of the European Parliament and of the Council of 21 May 2008 on ambient air quality and cleaner air for Europe. Key elements:

  - The merging of most of existing legislation into a single directive (except for the fourth daughter directive) with no change to existing air quality objectives (*Framework Directive 96/62/EC, 1-3 daughter Directives 1999/30/EC, 2000/69/EC, 2002/3/EC, and Decision on Exchange of Information 97/101/EC.*)
  - New air quality objectives for PM2.5 (fine particles) including the limit value and exposure related objetives – exposure concentration obligation and exposure reduction target
  - The possibility to discount natural sources of pollution when assessing compliance against limit values
  - The possibility for time extensions of three years (PM10) or up to five years (NO2, benzene) for complying with limit values, based on conditions and the assessment by the European Commission.
  - Requires that the procedures set out to under pin this Directive are compatible with Directive 2007/2/EC (INSPIRE)
  - More information http://ec.europa.eu/environment/air/quality/index.htm

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EU air quality legislation AQD - standards and criteria

"In order to ensure that the information collected on air pollution is sufficiently representative and comparable across the Community, it is important that standardised measurement techniques and common criteria for the number and location of measuring stations are used for the assessment of ambient air quality. Techniques other than measurements can be used to assess ambient air quality and it is therefore necessary to define criteria for the use and required accuracy of such techniques."

EU air quality legislation AQD – fora for the promotion of standards and criteria

- **AQUILA**
  The Network of Air Quality Reference Laboratories (AQUILA) was set up in 2001 in ISPRA. As a forum for information exchange it's objectives are to promote the harmonisation of air quality measurements and participate in standardisation activities as well as to co-ordinate quality assurance and quality control activities and to develop common research and pilot projects.
  (http://ies.jrc.ec.europa.eu/Units/eh/Projects/Aquila/)

- **FAIRMODE**
  The main aim of the Forum for AIR quality MODElling (FAIRMODE) is to bring together air quality modellers and users in order to promote and support the harmonised use of modelling practices for the assessment of air quality by EU member countries.
  http://pandora.meng.auth.gr/modnet/

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EU air quality legislation AQD IPR

- Implementing Decision 2011/850/EU (laying down rules for the air quality directives in force as regards the reciprocal exchange of information and reporting on ambient air quality)

  - Applies from 1 January 2014
  - Provides an opportunity to modernize data reporting, improve data quality, facilitate information sharing and reduce the administrative burden of reporting
  - Relates to INSPIRE themes: Human health, Atmospheric conditions, Environmental monitoring facilities and Area management

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EU air quality legislation AQD IPR "metadata to be reported and exchanged"

- Information on the assessment methods for the demonstration and subtraction of exceedances attributable to natural sources or to winter sanding or salting (Article 8)
- Information on the assessment methods (Article 9)
- Details listed in Annex II part D
  - (i) *General: information for all assessment methods*
  - (ii) *Fixed measurement Information*
  - (iii) *Indicative Measurement Information*
  - (iv) *Modelling Information*
  - (v) *Objective Estimation Information*

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E-reporting

- EEA supported by European Topic Centre for Air and Climate Change Mitigation (ETC/ACM) will assist the Commission to establish and operate the new mechanism for sharing air quality information (e-reporting)

- The new system will fulfil pre-existing commitments to supply in-situ data to the Global Monitoring for Environment and Security (GMES) Atmospheric Services

- It will adhere to the data specifications /services concepts promoted by the INSPIRE Directive as they become available.

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EEA's role vis-à-vis development

- EEA's role in relation to Implementing Provisions for Reporting and Exchanging Air Quality Data and Information has now evolved into **establishing e-Reporting**.

- This means **designing**, **developing** and **operating** a new, more efficient reporting mechanism, tailored to the needs of the countries and fulfilling the requirements of the IPR Decision which shall apply from 1 December 2014.

- The work involves **EEA's IT developers** and a team from **ETC/ACM**. The countries are currently involved through the **IPR pilot group** lead by **DG-ENV**.

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EEA's role in relation to the countries

- **Encouraging**
- **Engaging**
- **Extracting and Evaluating the needs**
- **Exemplifying**
- **Enabling**

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Progress until 1 June 2012

- **Air Quality Portal: http://www.eionet.europa.eu/aqportal**
- **Letter to EIONET**
- **e-Reporting helpdesk and FAQ**
- **Shared EEA development and testing environment**
- **EEA System architecture is shaping up**
- **Code list management at the EEA**
- **EEA Technical Report on e-Reporting**
- **Held two IPR Pilot meetings hosted at the EEA –> actions in progress**

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EEA Technical Report on e-Reporting

Presents the operational logic for an e-Reporting system:

- **the legal instruments (decisions and articles) at the origin of reporting requirements**

- **the activities required and rules for reporting**

- **data themes / flows to be reported**

- **existing and emerging systems for reporting**

- **current and new timescales for reporting**

- **responsibilities and roles within the e-Reporting system**

- **routines and solutions that may support countries under the new e-Reporting system**

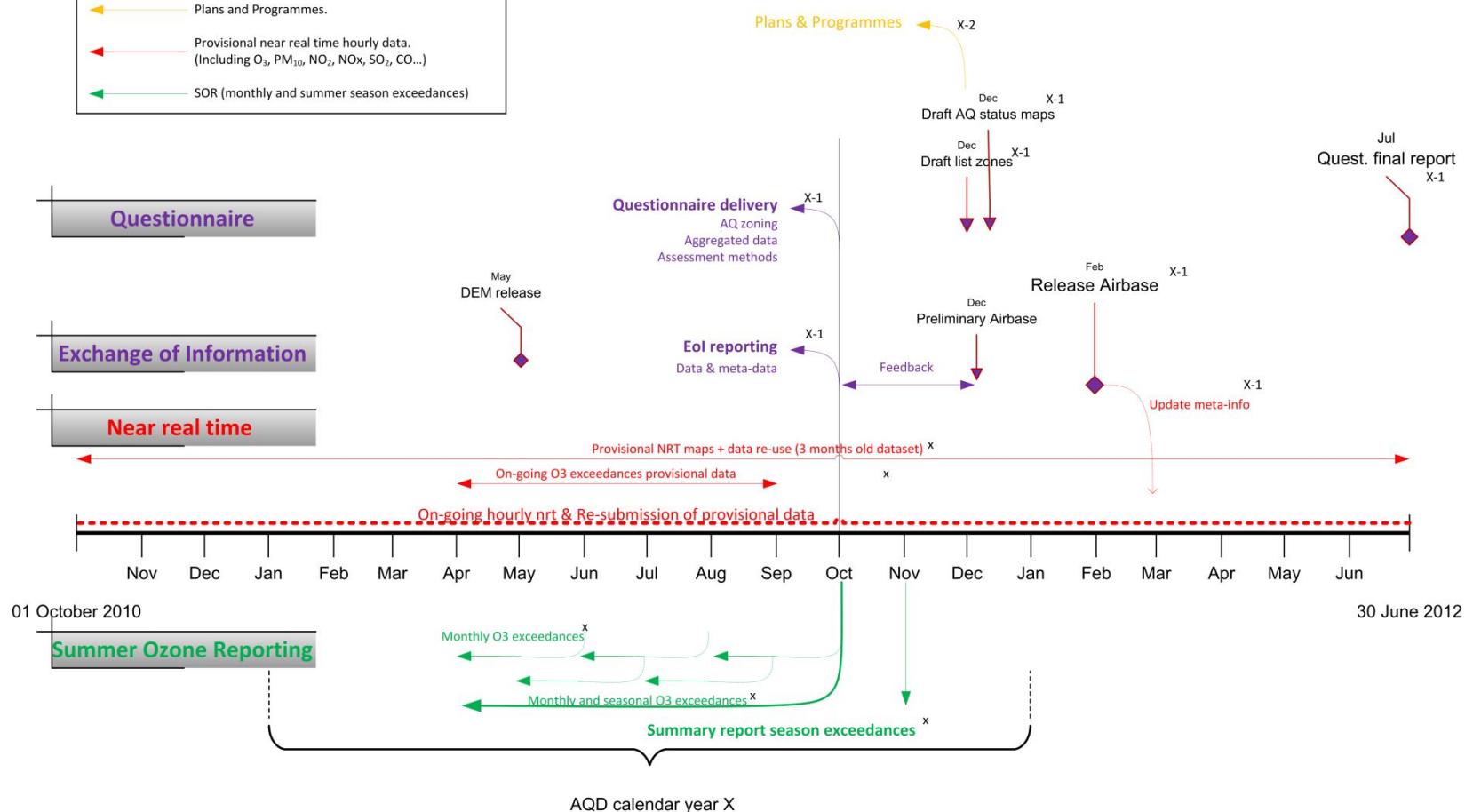**The report is aimed at data providers in the MS and other European countries linked to EIONET**

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Timeline of Current AQD data flow deliverables
Wednesday, May 18, 2011

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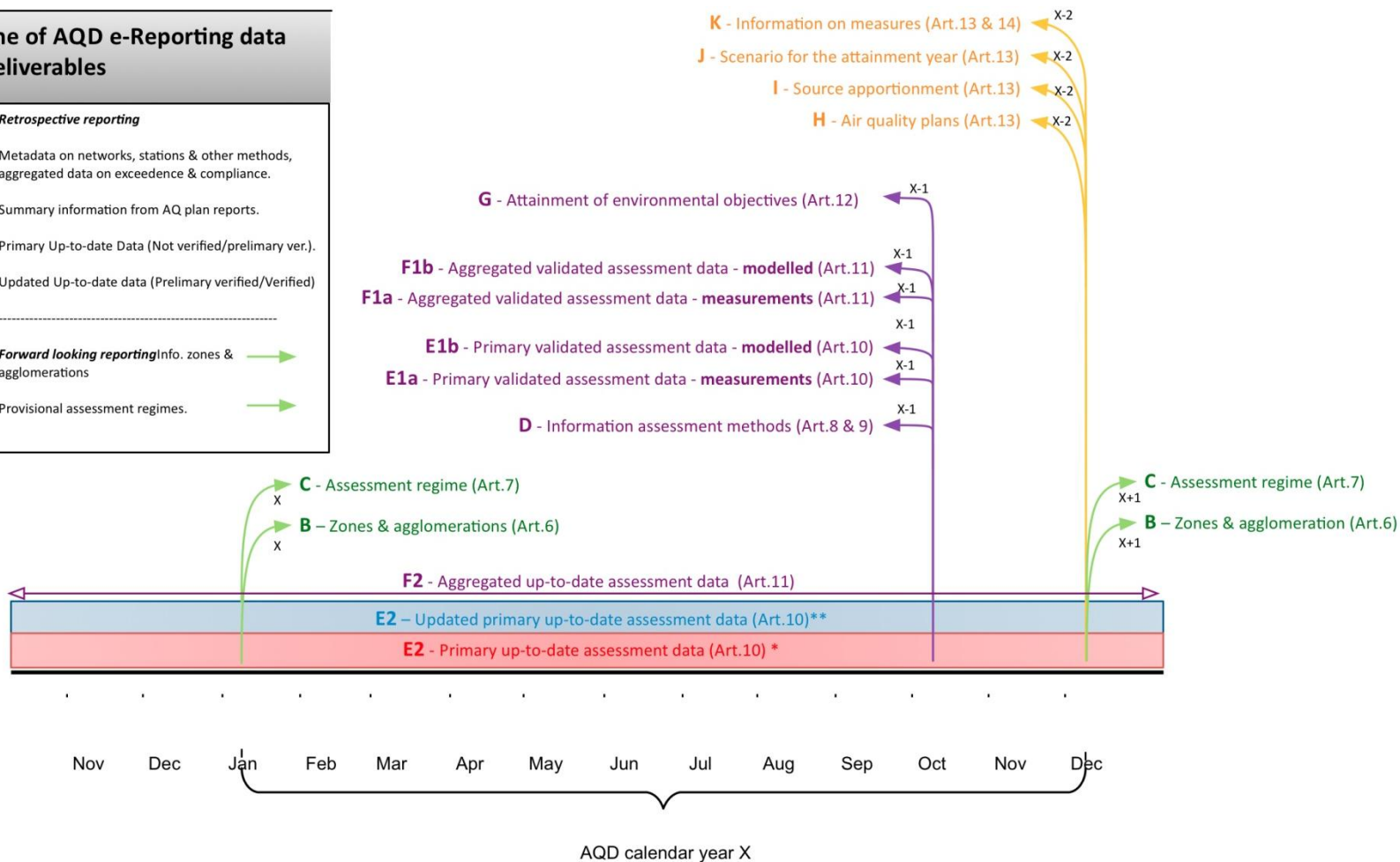
Timeline of AQD e-Reporting data flow deliverables

Retrospective reporting

Metadata on networks, stations & other methods, aggregated data on exceedence & compliance.

Summary information from AQ plan reports.

Primary Up-to-date Data (Not verified/prelimary ver.).

Updated Up-to-date data (Prelimary verified/Verified)

Forward looking reporting Info. zones & agglomerations

Provisional assessment regimes.

K - Information on measures (Art.13 & 14) — X-2
J - Scenario for the attainment year (Art.13) — X-2
I - Source apportionment (Art.13) — X-2
H - Air quality plans (Art.13) — X-2

G - Attainment of environmental objectives (Art.12) — X-1

F1b - Aggregated validated assessment data - **modelled** (Art.11) — X-1
F1a - Aggregated validated assessment data - **measurements** (Art.11) — X-1

E1b - Primary validated assessment data - **modelled** (Art.10) — X-1
E1a - Primary validated assessment data - **measurements** (Art.10) — X-1

D - Information assessment methods (Art.8 & 9) — X-1

C - Assessment regime (Art.7) — X
B – Zones & agglomerations (Art.6) — X

C - Assessment regime (Art.7) — X+1
B – Zones & agglomeration (Art.6) — X+1

F2 - Aggregated up-to-date assessment data (Art.11)
E2 – Updated primary up-to-date assessment data (Art.10)**
E2 - Primary up-to-date assessment data (Art.10) *

Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec

AQD calendar year X

Note: * The **primary up-to-date assessment data** shall be made available on a provisional basis with the frequency appropriate to each pollutant assessment method and within a reasonable timeframe after the data has been made available to the public according to Article 26 of Directive 2008/50/EC, for the pollutants specified for that purpose in Part B of Annex I to this Decision.
** Member States may **update the primary up-to-date assessment data** following further quality control. The updated information shall replace theoriginal information and its status shall be clearly indicated.

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IPR Pilot meeting: March 2012

15-16 March: Zones and Up-to-date (UTD)
data flows B and E2a

- **Representatives from the following 10 IPR pilot countries:** NO, ES, UK, IT, BE, SE, FR, IE, DE, PT

- **Successful testing of Zones data flow with:**

  IT, IE, FR, ES, UK, BE

- **Successful testing of UTD data flow with:**

  ES, IT, BE, SE, DK, UK, IE

- **IE shared easy-to-use script for Zones data**

- **Methods tabled for XML checks**

- **EEA ReportNet validation tool for XML can be modified and distributed to the countries.** EEA and ETC/ACM evaluates this.

- **EEA is setting up a database structure for B and E2a**

IPR Pilot meeting: May 2012

24-25 May: Annual Assessment & progress on Zones and UTD data flows: C, D, E1a (retrospective B, E2a)

- **Representatives from the following 9 IPR pilot countries:**
  DE, DK, BE, ES, FR, IT, NL, SE, UK
- **Presentation of the IT work so far in the EEA**
- **Presentations of progress in ES, FR BE, IT**
- **Zones data flow process model created by the EEA and shared**
- **EEA script for UTD data to be shared with the countries**
- **Technical discussions and decisions regarding naming conventions, time representation, etc.**

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Upcoming IPR Pilot meetings dedicated to IT developments: October, December 2012

9 October 2012: Modelling (data flows E1b and F1b) + retrospective

4 December 2012: Air quality management plans and measures (data flow H) + retrospective

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Main challenges so far

- **Issues loading XML example of air quality management zones into EEA systems**: resolved through work arounds.

- **Issues with gml:id as the link between data flows:** unresolved, work in progress.

- **Pointers in the schema not working:** resolved - local schema references to be used instead.

- **Not easy to understand how the feature classes relate in the IPR data model and the schema structure and content:** ongoing capacity buildning on INSPIRE concepts; mapping of elements from current reporting data flows to IPR data flows.

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- **Organize and host as foreseen two other IPR pilot meetings** in 2012.
- **Continue testing** of the countries ability to create the data sets and the ability of the EEA systems to process the data.
- **Schema updates** arising from IT developments, INSPIRE and IPR pilot testing (soon)
- **Core elements (data repositories and a first set of routines)** of the EEA system should be ready for operational use from 1 January 2013.
- **Ensure interoperability** between the various data types and data flows as well as other environmental data handled by the EEA. (continuous)
- **Create the reporting toolbox**: data processing routines for managing the system, verification, quality assurance, aggregation of information generated from primary data, report templates and routines to generate ready-to-use reports, data dissemination incl. download and visualization. (2012-2013-2014)
- **INSPIRE**: A JRC-DG ENV administrative arrangement – "INSPIRE Air quality pilot" will entail to update all the current air quality schemata, based on the INSPIRE data specification updates. Such work will be incorporated in the e-Reporting development. (2012-2013)
- **Develop interface**, <u>as necessary,</u> to enable all European countries' reporting and data sharing of XML. (2013-2014)
- **Develop routines for linking to outputs** from the operational GMES Atmospheric Service and other data services. (2013-2014)

Outlook

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Services and products (A)

- **The air quality portal** (IN PLACE)
- **e-Reporting FAQ** (IN PLACE under the air quality portal)
- **e-Reporting Helpdesk** (IN PLACE under the air quality portal – operational for IPR pilot countries)
- **Schema repository** under the air quality portal hosting: schema documents, code lists, schema guidance, schema mapping to IPR data elements, the data model.(2012)
- **Metadata repository** for e-Reporting. (2012)
- **Software repository** for e-Reporting. (2012)
- **Data repository** (**5** data typologies and **14** data flows) – AirBase+ (2012-2013)
- **Reporting toolbox**: routines for system management, verification, QA/QC, aggregation and statistics, reports (e.g. ready for endorsement by the countries). (2012-2014)
- **Data transformation imposed by INSPIRE**: Guidance or routines. (2013-2014)

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Services and products (B)

- **Data visualisation services**: services to enable users to visualise all e-Reporting data flows via user defined queries and view in on-screen forms and as spatial data via a Web Feature Service (WFS) for geographically resolved information. Perhaps requires further coordination with viewing requirements of the QA/QC routines. (2013-2015)

- **Data download service:** services to enable users to download the e-Reporting data and data flows via user defined queries; and download summary compliance or attainment reports demonstrating exceedance or otherwise of environmental objectives at Member State or AQ zone level. (2013-2015)

- **Resources and products** to fulfil EEA and DG-ENV responsibilities to the compilation of EU ambient air quality information for general assessment and under the AQD in relation to (2013-2014):

  - AirBase+ (metadata, data, statistics, AQ plans)
  - Annual Air Quality in Europe Report (maps, distance-to-target, trends, country box plots)
  - Compliance reports on ambient AQ assessment (attainment of environmental objectives and fulfilling of reporting obligations)
  - Up-to-date data flows and short-term threshold exceedances
  - AQ management plans
  - MS national contact points and INSPIRE node addresses

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Services and products (C)

- **e-Reporting transaction log:** storing metadata documents cataloguing all e-Reporting submissions, re-submissions and updates at a Member State level. (2013-2014)

- **e-Reporting registry service:** a web registry service that supports the run-time discovery and evaluation of resources such as services, datasets, and application schema. (2014)

- **Expanded data service** to gather and share data from dense sensor networks, mobile "laboratories" and other non-dataflow data, including modelling data provided by GMES. (2013-2015)

The type and content of some of the above products and services need to be defined in conjunction with the EEA (supported by ETC/ACM) DG-ENV and countries' user needs. (2012-2013)
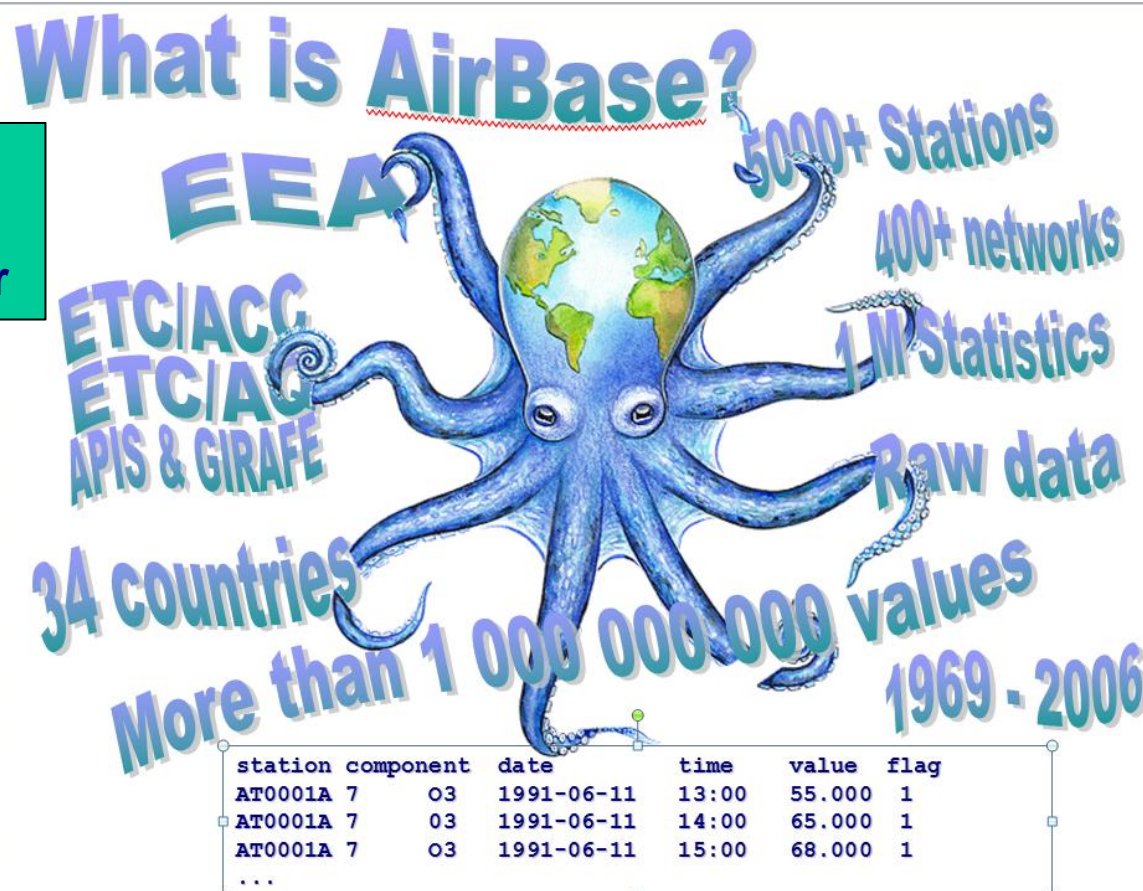
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What metadata is available from the current system?

- AirBase is the air quality information system maintained by the EEA through the European topic centre on Air and Climate Change Mitigation.

- It contains air quality data delivered annually under 97/101/EC Council Decision establishing a reciprocal exchange of information and data from networks and individual stations measuring ambient air pollution within the Member States (EoI Decision).

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AirBase in 2006

Measurement data growth: ~15% per year

What is AirBase?

EEA

ETC/ACC
ETC/AQ
APIS & GIRAFE

5000+ Stations

400+ networks

1 M Statistics

34 countries

Raw data

More than 1 000 000 000 values

1969 - 2006

station	component		date	time	value	flag
AT0001A	7	O3	1991-06-11	13:00	55.000	1
AT0001A	7	O3	1991-06-11	14:00	65.000	1
AT0001A	7	O3	1991-06-11	15:00	68.000	1
...						

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Overview of mandatory meta information to be delivered under the EoI
(Numbers according to Annex II of the EoI

- I.1. Name of the network
- I.4.1. Name of the body responsible for network management
- I.4.2. Name of person responsible
- I.4.3. Address
- I.4.4. Telephone and fax numbers
- I.5. Time reference basis
- II.1.1. Name of the station
- II.1.4. Station code given under the present decision and to be provided by the Commission
- II.1.8. Geographical co-ordinates
- II.1.10. Pollutants measured
- II.1.11. Meteorological parameters measured
- II.2.1. Type of area

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Overview of non-mandatory meta information to be delivered under the EoI

(Numbers according to Annex II of the EoI

- I.2. Abbreviation (of the network)
- I.3. Type of networks
- I.4.5. E-mail (of the body responsible for the network)
- I.4.6. Website address
- II.1.2. Name of the town/city of location (of the station)
- II.1.3. National and/or local reference number or code
- II.1.5. Name of technical body responsible for the station
- II.1.6. Bodies or programmes to which data are reported
- II.1.7. Monitoring objectives
- II.1.9. NUTS level IV
- II.1.12 Other relevant information
- II.2.2. Type of station in relation to dominant emission sources
- II.2.3. Additional information about the station
- III.1.1. Name (of measurement equipment)
- III.1.2. Analytical principle or measurement method
- III.2.1. Location of sampling point
- III.2.2 Height of sampling point
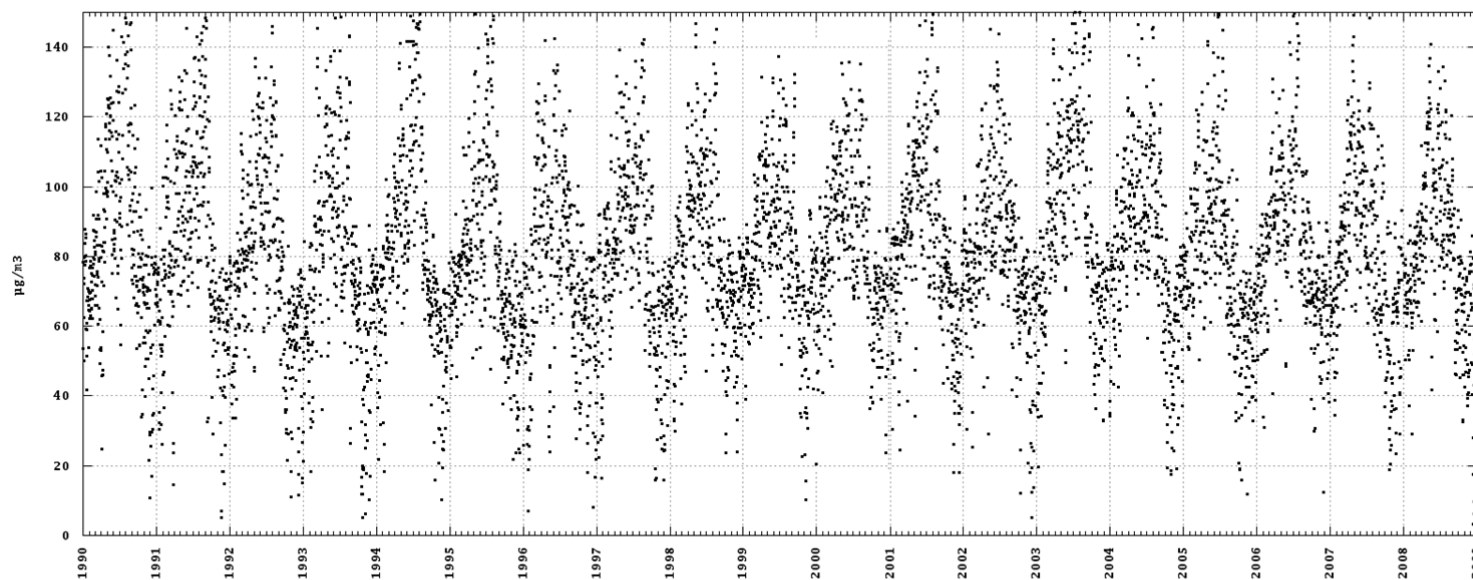- III.2.3 Result-integrating time
- III.2.4 Sampling time

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Overview of mandatory pollutants to be delivered under the EoI

EoI nr.	Formula	Name of pollutant	Units of measurement	Average over
1	SO_2	Sulphur dioxide	$\mu g/m^3$	1 h
2	NO_2	Nitrogen dioxide	$\mu g/m^3$	1 h
3	PM_{10}	Particulate matter < 10 µm	$\mu g/m^3$	24 h
4	$PM_{2.5}$	Particulate matter < 2.5 µm	$\mu g/m^3$	24 h
5	SPM	Total suspended particulates	$\mu g/m^3$	24 h
6	Pb	Lead	$\mu g/m^3$	24 h
7	O_3	Ozone	$\mu g/m^3$	1 h
8	C_6H_6	Benzene	$\mu g/m^3$	24 h
9	CO	Carbon monoxide	mg/m^3	1 h
10	Cd	Cadmium	ng/m^3	24 h
11	As	Arsenic	ng/m^3	24 h
12	Ni	Nickel	ng/m^3	24 h
13	Hg	Mercury	ng/m^3	24 h
14	BS	Black smoke	$\mu g/m^3$	24 h
15	NO_x	Nitrogen oxides	$\mu g\ NO_2/m^3$	1 h

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Example of a time series from AirBase

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